Project V: Normalization

Agnar Ísaksson

Ágúst Helgi Árnason

Normalization of Rentals

Analysis:

Primary key: PID_HID
Determined FDs: PID -> PN, HID-> HZ, HID -> HC, HID -> HS, HZ -> HC
Minimal cover: PID_HID -> S, PID -> PN, HID-> HZ, HID -> HC, HID -> HS, HZ -> HC
Other Keys: None
Normal form: 2NF
Decomposition: RENTALS_PID_HID_S, RENTALS_PID_PN, RENTALS_HID_HZ, RENTALS_HID_HC, RENTALS_HID_HS, RENTALS_HZ_HC

Table: RENTALS_PID_HID_S

Columns: PID, HID, S
Key: PID_HID
FDs: PID_HID -> S
Normal forms:

- Since all FDs are key FDs, the table is BCNF
- Since the keys are a superkey, each independent key combination can be treated as a single column and therefore the table is in 4NF

Table: RENTALS_PID_PN

Columns: PID, PN
Key: PID
FDs: PID -> PN
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: RENTALS_HID_HZ

Columns: HID, HZ
Key: HID
FDs: HID -> HZ
Normal forms:

- Since all FDs are key FDs, the table is in BCNF

- Since the key has a single column, the table is in 4NF

Table: RENTALS_HID_HC

Columns: HID, HC
Key: HID
FDs: HID -> HC
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: RENTALS_HID_HS

Columns: HID, HS
Key: HID
FDs: HID -> HS
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: RENTALS_HZ_HC

Columns: HZ, HC
Key: HZ
FDs: HZ -> HC
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Normalization of Coffees

Analysis:

Primary key: DID_HID_CID
Determined FDs: DID -> DN, DID -> DS, CID -> CN, CID -> CM
Minimal cover: DID_HID_CID -> DID_HID_CID, DID -> DN, DID -> DS, CID -> CN, CID -> CM
Other Keys: None
Normal form: 1NF
Dcomposition: COFFEES_DID_HID_CID, COFFEES_DID_DN, COFFEES_DID_DS, COFFEES_CID_CN, COFFEES_CID_CM

Table: COFFEES_DID_HID_CID

Columns: DID, HID, CID
Key: DID_HID_CID
FDs: None
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has the three column, MVDs were sought resulting in the following MVD: DID -> -> HID, DID -> -> CID; the table is therefore NOT in the 4NF and must be decomposed.

Decomposition: COFFEES_DID_HID, COFFEES, DID_CID

Table: COFFEES_DID_HID

Columns: DID, HID
Key: DID_HID
FDs: None
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the table is too small for MVDs, the table is in 4NF

Table: COFFEES_DID_CID

Columns: DID, CID
Key: DID_CID
FDs: None
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the table is too small for MVDs, the table is in 4NF

Table: COFFEES_DID_DN

Columns: DID, DN
Key: DID
FDs: DID -> DN
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: COFFEES_DID_DS

Columns: DID, DS
Key: DID
FDs: DID -> DS
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: COFFEES_CID_CN

Columns: CID, CN
Key: CID
FDs: CID -> CN
Normal forms:
- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: COFFEES_CID_CM

Columns: CID, CM
Key: CID
FDs: CID -> CM
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Normalization of Projects

Analysis:

Primary key: ID_PID_SID
Determined FDs: ID -> MID, ID -> MN, SID -> SN, SN -> SID, MID -> MN, MN -> MID
Minimal cover: ID_PID_SID -> PN, ID_PID_SN -> SID, ID -> MID, MID -> MN
Other Keys: None
Normal form: 3NF
Dcomposition: No decomposition needed

Normalization of Customers

Analysis:

Primary key: CID
Determined FDs: CZ -> CC
Minimal cover: CID -> CS_CNR_CZ_CC_EID, CID -> CN, CZ -> CC
Other Keys: None
Normal form: 2NF
Dcomposition: CUSTOMERS_CID_CS_CNR_CZ_CC_EID, CUSTOMERS_CID_CN, CUSTOMERS_CZ_CC

Table: CUSTOMERS_CID_CS_CNR_CZ_CC_EID

Columns: CID, CS, CNR, CZ, CC, EID
Key: CID
FDs: CID -> CS_CS_CNR_CZ_CC_EID
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: CUSTOMERS_CID_CN

Columns: CID, CN
Key: CID

FDs: CID -> CN
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF

Table: CUSTOMERS_CZ_CC

Columns: CZ, CC
Key: CZ
FDs: CZ -> CC
Normal forms:

- Since all FDs are key FDs, the table is in BCNF
- Since the key has a single column, the table is in 4NF